

APPENDIX A: ASSESSMENT OF PLANT AND WILDLIFE CANDIDATES FOR ESA LISTING AND SPECIES OF CONCERN

The species list provided by the USFWS (1-7-99-SP-262) identified numerous candidate species and species of concern (and one formerly listed species) that may occur in the area of the 13 Willamette Basin projects. While the USACE is not required to consult on these species, the information in this Appendix is provided to address only those species known to occur on USACE project lands. While other species that are candidates or species of concern may potentially occur at the projects, the discussion below is limited to those species confirmed at the projects.

PEREGRINE FALCON

Biological Information

The American peregrine falcon (*Falco peregrinus*) occurs throughout North America from the taiga region of Alaska and Canada south to Baja California (Snow 1972). The current peregrine falcon population in the 48 contiguous United States is below historic levels. This decline is attributed to eggshell thinning and associated with reproductive failure (Pacific Coast American Peregrine Falcon Recovery Team 1982, Aulman 1992) correlated with widespread use of organochlorine contaminants (Pagel and Jarman 1991). Other pollutants, disturbance, loss of nesting and foraging habitats, shooting, and collisions have also contributed to the reduction of peregrine falcon numbers (Pacific Coast Peregrine Falcon Recovery Team 1982).

Peregrine falcons historically occurred in a variety of coastal and inland areas throughout Oregon, including the Cascades, the Snake River Canyon, the Columbia River, and in the Crater Lake/Fort Klamath area (Henny and Nelson 1981, Pacific Coast American Peregrine Falcon Recovery Team 1982). Estimates of the number of historic peregrine falcon eyries in Oregon range from 42 to approximately 70 (Pagel 1992). Efforts toward the recovery of the peregrine falcon in Oregon included nest manipulation and enhancement, hacking, and monitoring.

Peregrine falcons primarily occupy precipitous cliffs greater than 25 to 30 meters (80 to 100 feet) in height, usually within 402 to 805 meters (0.25 to 0.5 miles) of riparian, lacustrine, or marine habitat (Ehrlich et al. 1988, Pagel 1992, Pagel personal communication 2000). Peregrine falcons nest on cliff ledges, and may scrape out shallow hollows in soil, decomposed rock, or gravel, and may occasionally use abandoned nests of eagles, hawks, or ravens (Terres 1980). A pair of falcons may favor a particular cliff and return each year to breed (Snow 1972). One or two alternate nest sites along an escarpment are common (Palmer and White 1988). Peregrines defend an area that may extend 200 to 300 meters (660 to 990 feet) around the eyrie.

The peregrine falcon is specialized for capturing aerial prey, feeding primarily on avian prey including shorebirds, waterfowl, and passerines (Henny and Nelson 1981, Ehrlich et al. 1988,

Sharp 1992). The entire foraging range in the breeding season can be as large as 104 square kilometers (40 square miles) (Palmer and White 1988). The Willamette Valley and coastal flatlands and headlands are used as wintering habitat for peregrine falcons in Oregon (Pagel personal communication 2000).

Peregrines lay three to four eggs from early March to late May or early June (Thelander 1978, Palmer and White 1988). The average incubation period is typically 31.5 days in western North America (Pagel personal communication 2000). The young begin to fly after 39 to 49 days of hatching but remain dependent on the adults for food until their hunting skills have developed; usually during the fall (Thelander 1978, Palmer and White 1988). If a nesting attempt fails, a pair may undertake an abbreviated courtship, within 14 days of the failure, in a second attempt at nesting (recycle).

Blasting, road construction, low-flying aircraft, and recreational activities (i.e., photographers, bird-watchers, hikers, and rock climbers) may disturb nesting peregrine falcons. Disturbances may result in nest or territory abandonment or desertion; exposure of eggs and/or young to the elements or predators by excessive absence of the adults; trampling or puncturing of eggs or young, or ejecting eggs or young from the nest by a frightened or flushing adult; missed feedings of the young; or premature fledging of young resulting in injury or death (e.g., due to critical injury, exposure, or predation) (Fyfe and Olendorff 1976, Olsen and Olsen 1978, Pacific Coast American Peregrine Falcon Recovery Team 1982). Peregrines are most susceptible to human disturbance during courtship and incubation; nest tenacity by adults increases as incubation progresses and hatching occurs (Fyfe and Olendorff 1976, Olsen and Olsen 1978, Pacific Coast American Peregrine Falcon Recovery Team 1982).

Environmental Baseline

The American peregrine falcon was removed from the Federal list of threatened and endangered species in 1999. The Oregon Natural Heritage Program (1998) identifies the peregrine falcon in Lane, Linn, Multnomah Counties of the Willamette Valley. However, in 1999 there were 80 known sites in Oregon of which 52 were active (Pagel personal communication 2000). Peregrine falcons have been observed on several Willamette Basin projects, but the species does not nest on USACE project lands. In the broader vicinity of the 13 Willamette Basin projects, however, there are 22 known eyries on the Willamette National Forest (Pagel, personal communication, 2000). Peregrine falcons may forage at the projects, and prey may include riparian species and waterfowl that are supported by the projects.

OREGON SPOTTED FROG

Biological Information

The Oregon spotted frog (*Rana pretiosa*) is a highly aquatic frog that is always found in or near year-around waterways. Important habitats include relatively shallow, aquatic habitats with emergent or aquatic vegetation along the edges of marshy ponds, lakes, springs, or slow-moving streams; shallow, marshy pools near lakes including those of temporary duration; and small floodplain wetlands associated with permanent bodies of water (McAllister and Leonard 1997, Marshall 1992). Spotted frogs breed in late winter and early spring in exposed shallow water pools (McAllister and Leonard 1997). Egg masses are deposited in shallow water in communal piles, the masses unattached to vegetation (McAllister and Leonard 1997, Stebbins 1954). The eggs hatch after a period of approximately 18 to 30 days, and the tadpoles are primarily herbivorous, feeding on plant tissue, algae, bacteria, detritus, rotting vegetation, and possibly carrion (McAllister and Leonard 1997). In approximately 13 to 16 weeks, the tadpoles metamorphose and become carnivorous, feeding primarily on insects (McAllister and Leonard 1997).

The range of the Oregon spotted frog from southwestern British Columbia south to northeastern California (McAllister and Leonard 1997). Originally thought to extend from southeast Alaska, through British Columbia, and south through Washington, Oregon, Idaho, western Montana, to northern Utah and northern Nevada (58 FR 27260), the Oregon spotted frog was recently genetically differentiated from the Columbian spotted frog (*Rana luteiventris*) (McAllister and Leonard 1997). The Oregon spotted frog now includes just the extreme western population of the species as it was recognized in 1993.

Environmental Baseline

In Oregon, the Oregon spotted frog historically occurred in scattered locations through much of the state. The Oregon Natural Heritage Program (1998) includes the following Willamette Valley counties in the distribution of the Oregon spotted frog: Benton, Clackamas, Lane, Linn, Marion, Multnomah, Washington, and Yamhill. It is now, however, thought to be extirpated west of the Cascade Range, and is limited to 8 of 44 historic sites in Oregon and only 13 of 59 historic sites range wide (58 FR 27280, McAllister and Leonard 1997). It is said to have disappeared from the Willamette Valley in the 1950's, but Marshall (1992) reports a specimen taken in 1983 near Hidden Lake, south of Cougar Reservoir. Threats to the Oregon spotted frog include habitat loss caused by the construction of dams and reservoirs, modifications to river hydrology alterations to drainage patterns, and the introduction and naturalization of predaceous non-native species (58 FR 27280).

NORTHWESTERN POND TURTLE

Biological Information

The northwestern pond turtle (*Clemmys marmorata marmorata*) occurs from Puget Sound, Washington, to Baja, California, and is found primarily west of the Sierra-Cascade crest. In Oregon, most records occur in the major drainages of the Klamath, Rogue, Umpqua, Willamette, and Columbia River systems.

The northwestern pond turtle lives in ponds, reservoirs, lakes, sloughs, and slow-moving streams. The most important habitat component appears to be the presence of aquatic vegetation and/or physical structure such as overhanging ledges, crevices, large floating logs, etc., which allow turtles to surface for air without exposing themselves to predators. Turtles will be visible basking between late-February and November. Turtles prefer basking sites that are near deep water, away from the shoreline, and in direct sun, and that offer a good view of the area. Northwestern pond turtles feed primarily on aquatic invertebrates, but dead fish and other carrion are important food sources, especially in flood control reservoirs that lack emergent vegetation.

Turtles lay their eggs in excavated holes on slight slopes with southern exposures, above the flood zone. The nesting period lasts approximately six weeks, and, in the Willamette Valley, usually begins around 1 June. Eggs hatch in the fall, approximately 90 days later, with hatchlings remaining in the nest until early spring.

Turtles and their eggs are vulnerable to a variety of terrestrial predators. In the Willamette Valley population, observations have determined very low numbers of juvenile turtles, possibly due to predation by the introduced bullfrog (*Rana catesbeiana*), and by agricultural use of nesting areas adjacent to ponds.

The northwestern pond turtle occurs in a wide variety of both permanent and ephemeral wetlands, including lakes, ponds, streams, rivers, and altered habitats including reservoirs, stock ponds, and sewage treatment plants (Holland, 1994). In most habitats, a variety of basking areas and emergent vegetation are present, and refugia may include undercut banks, submerged vegetation, rocks, or logs. Nearby terrestrial habitats are used for egg laying, overland dispersal, and overwintering (Holland, 1991).

Environmental Baseline

The Willamette Valley distribution of the northwestern pond turtle includes Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington, and Yamhill Counties (Oregon Natural Heritage Program 1998). The northwestern pond turtle was petitioned for listing under the Endangered Species Act in 1992. Subsequently, a large population was discovered in Fern Ridge Lake. Since that time, extensive monitoring and management efforts have been undertaken at Fern Ridge. This population is thought to be one of the largest extant in the

Willamette Valley floor. Initial observations of the Fern Ridge northwestern pond turtle population indicating a strong adult bias were confirmed by field work in 1993 that included both trapping and visual surveys. Based on preliminary review of the 1993 surveys, adults appear to comprise 90 to 95 percent of the turtle population at Fern Ridge. The total population is estimated to be roughly 200. This apparent failure to sustain juveniles in the population is expected to lead to a failure to recruit new adults to the population, further population decline, and eventual local extirpation. Intensive management to reverse this decline by headstarting hatchling turtles, and annual nest location and protection was begun in 1993 at Fern Ridge. From 22 to 28 nests are located and protected with predator exclosures each year.

Lookout Point Reservoir has been identified as playing an important role in the recovery of the northwestern pond turtle in the Willamette Valley. Recent studies (Hardin 1993, Beal 1994) indicate that recruitment of juveniles appears to be occurring within the reservoir. Holland (1994) identified Lookout Point as an important connector between upstream populations on the Middle Fork Willamette River, and the central recovery area at the confluence of the Coast and Middle forks of the Willamette.

Fall Creek Reservoir supports a much smaller and presumably dwindling population of northwestern pond turtles. USACE management efforts at Fall Creek have focussed on Tufti and Spillway Ponds below the dam, which together support a larger population than the reservoir itself.

Northwestern pond turtles are found within the following reservoirs: Lookout Point, Fall Creek, Dexter, Hills Creek, and Fern Ridge. Historical sightings exist for Cottage Grove Reservoir. Pond sites include Kirk, Tufti, Spillway, Hills Creek, Fish Hatchery, and Sunnyside Ponds at Foster, and Schwarz Pond at Dorena. Dexter Ponds below the dam need further survey. Northwestern pond turtle nests have also been located at Hills Creek Pond, Tufti Pond, and Spillway Ponds.

PACIFIC WESTERN BIG-EARED BAT

Biological Information

Pacific western big-eared bats (*Corynorhinus townsendii*) are found from British Columbia south through the western United States through Mexico. This species inhabits humid coastal forest as well as arid pine forest and scrub areas where it feeds on moths and other insects (Nagorsen and Brigham 1993, Marshall 1992). The *townsendii* subspecies is darker and is limited to west of the Cascades from southwestern British Columbia to California (Nagorsen and Brigham 1993, Marshall 1992). In the Willamette Valley, the species is documented in Benton, Clackamas, Lane, Linn, Marion, Multnomah, and Washington Counties (Oregon Natural Heritage Program 1998). The Pacific western big-eared bat typically uses caves, mines, and buildings for its

separate day and night roost sites, while caves and mines serve as winter hibernacula (typically October through April) (Marshall 1992, Maser et al. 1984). They do not crawl into cracks or crevices like other bats, but hang from open ceilings. Mating occurs from November to February, and a single young is born in late-May to early-June after the females have formed nursery colonies (Nagorsen and Brigham 1993, Maser et al. 1984). Pacific western big-eared bats are highly sensitive to and intolerant of human disturbance and may abandon hibernacula or nursery colonies if disturbed.

Environmental Baseline

Pacific western big-eared bats have been observed on USACE project lands and adjacent private land. Solitary bats have been observed in an old quarry along Fall Creek Road at the Fall Creek Reservoir. A single Pacific western big-eared bat was also observed in the right abutment at Dorena Dam. This individual was removed and the opening secured to preclude further entrance. Small groups of this species have been observed day-roosting and hibernating in caves near Lookout Point Reservoir. These lands are owned and managed by Weyerhaeuser Co. Bats found using dams, powerhouses, or other structures on USACE project lands are identified prior to removal or exclusion.

LONG-LEGGED MYOTIS

Biological Information

Long-legged myotis (*Myotis volans*) are found from western Canada south through the western United States to Mexico. In the Willamette Valley, the species is documented in Linn and Marion Counties (Oregon Natural Heritage Program 1998). Coniferous forests are the primary habitat for the long-legged myotis, but it also occurs in riparian and desert habitats in some areas (Verts and Carraway 1998, Nagorsen and Brigham 1993). It uses rock crevices, buildings, fissures in bark, or the ground for day roosts, and emerges early in the evening to feed (Nagorsen and Brigham 1993). They forage in-flight, feeding heavily on moths, although termites, spiders, flies, beetles, and other insects are also part of its diet (Nagorsen and Brigham 1993, Verts and Carraway 1998). In winter, the long-legged myotis hibernates in caves and mines. Long-legged myotis mate in the early fall prior to hibernation, and the single young is born the following summer in June or July (Nagorsen and Brigham 1993). Maternity colonies are found in attics, fissures, and under bark (Nagorsen and Brigham 1993).

Environmental Baseline

Surveys conducted in 1997 identified long-legged myotis at the Fall Creek and Hills Creek projects. This species could occur at other projects based on their range and habitat use. Bats found using dams, powerhouses, or other structures on USACE project lands are identified prior to removal or exclusion.

LONG-EARED MYOTIS

Biological Information

Long-eared myotis (*Myotis evotis*) are found from southern British Columbia south to Baja. These bats feed primarily on moths and beetles, plucking them off the ground or foliage rather than on the wing. Long-eared myotis are known to inhabit coniferous forest and arid grasslands in a wide elevation range, and in the Willamette Valley are documented in Clackamas, Lane, Linn, Polk, and Yamhill Counties (Oregon Natural Heritage Program 1998). They use buildings, bark and rock crevices for day roosts, caves and mine entrances for night roosts, and buildings for small maternity colonies (Nagorsen and Brigham 1993). It is likely that mating takes place in the late-summer to early-autumn, but ovulation and fertilization do not take place until the following spring (Nagorsen and Brigham 1993). A single offspring is born in late June and early July (Nagorsen and Brigham 1993). Males and non-pregnant females will roost separately from pregnant and postpartum females.

Environmental Baseline

Surveys in 1997 detected long-eared myotis at the Fall Creek, Fern Ridge, and Cougar Projects. This species could occur at other projects based on their range and habitat use. Bats found using dams, powerhouses, or other structures on USACE project lands are identified prior to removal or exclusion.

FRINGED MYOTIS

Biological Information

Fringed myotis (*Myotis thysanodes*) are found in a variety of habitats from the Okanogan Valley in British Columbia south through the western United States to Mexico (Verts and Carraway 1998, Nagorsen and Brigham 1993, Marshall 1992). In the Willamette Valley, this species is known to occur in Benton, Clackamas, Lane, Multnomah, Washington, and Yamhill Counties (Oregon Natural Heritage Program 1998, Marshall 1992). This colonial species is known to roost in tightly-packed clusters in caves, mines, snags, rock crevices, bridges, buildings, and under bark (Christy and West 1993, Verts and Carraway 1998). It hunts at night, usually between 1 and 2 hours after sunset, feeding on moths, flies, beetles, leafhoppers, lacewings, crickets, and harvestmen (Nagorsen and Brigham 1993). Prey is taken in air as well as gleaned from a variety of substrates (Verts and Carraway 1998, Nagorsen and Brigham 1993). Young are born in late-June to early-July in large nursery colonies that have been found in caves, mines, buildings, and similar sites (Verts and Carraway 1998, Marshall 1992, Nagorsen and Brigham 1993).

Environmental Baseline

During bridge surveys in 1997, fringed myotis were captured night-roosting at Fall Creek and Fern Ridge projects. This species could occur at other projects based on their range and habitat

use. Bats found using dams, powerhouses, or other structures on USACE project lands are identified prior to removal or exclusion.

HARLEQUIN DUCK

Biological Information

The harlequin duck (*Histrionicus histrionicus*) is a winter transient and visitor of rocky coastal shores in Oregon and along other North American coasts (Gilligan et al. 1994, Ehrlich et al. 1988). This medium-sized diving duck is a rare summer resident in the northern and central Cascade Mountains, breeding along swiftly flowing, rough, turbulent mountain streams, typically nesting under shrubs, debris, or rocks along these streams (Gilligan et al. 1994, Marshall 1992). It may also nest in rock crevices among boulders or in tree cavities (Gilligan et al. 1994, Marshall 1992). Harlequin ducks feed primarily on crustaceans, mollusks, aquatic insects, and fish (Marshall 1992, Ehrlich et al. 1988).

Environmental Baseline

In the Willamette Valley, the harlequin duck is documented in Clackamas, Lane, Linn, Marion, and Multnomah Counties (Oregon Natural Heritage Program 1998). The species is documented breeding in the McKenzie, North Santiam, and drainages of the upper Willamette River (Gilligan et al. 1994). Harlequin ducks have been observed in the tailrace below Cougar Dam, but breeding has not been documented on USACE project lands in the Willamette Basin.

LITTLE WILLOW FLYCATCHER

Biological Information

The little willow flycatcher (*Empidonax trailii brewsteri*) is a common to uncommon summer resident in Oregon west of the Cascade Range. This species occupies thick willow borders along streams and lakes, woodland edges, and young alder stands, as well as tall brushy margins of fields (Gilligan et al., 1994). Migrants typically begin arriving in mid-May, but migration may be as late as early June in some years.

Environmental Baseline

In the Willamette Valley, the little willow flycatcher is documented in Benton, Clackamas, Lane, Linn, Marion, Multnomah, Washington, and Yamhill Counties (Oregon Natural Heritage Program 1998). USACE project lands support suitable habitat for the little willow flycatcher. This species is likely to occur (and breed) on USACE project lands in the Willamette Basin, however, surveys have not been undertaken to determine presence of the species.

OLIVE-SIDED FLYCATCHER**Biological Information**

The olive-sided flycatcher (*Contopus borealis*) is a neotropical migrant that breeds in coniferous forests throughout Oregon and is typically associated with forest edges with snags or dead-topped trees (Campbell et al. 1997, Gilligan et al., 1994). Migrants use more diverse habitats and may be found in the area during May and from late August to early September (Gilligan et al., 1994). The species winters in the mountains of South America from Colombia and Venezuela south to south-eastern Peru (Ehrlich et al. 1988).

Environmental Baseline

The olive-sided flycatcher is documented in all counties in the Willamette Valley (Oregon Natural Heritage Program 1998). USACE project lands support suitable habitat for the olive-sided flycatcher. The olive-sided flycatcher is likely to occur (and breed) on USACE project lands in the Willamette Basin, however, surveys have not been undertaken to determine presence of the species.

STREAKED HORNED LARK**Biological Information**

The streaked horned lark (*Eremophila alpestris strigata*) is a sparrow-sized ground-nesting bird that breeds west of the Cascade Range from southwestern British Columbia to southern Oregon (Marshall 1992). Other subspecies are migrants, wintering birds, or residents of other parts of the state (Marshall 1992). The streaked horned lark occupies open, sparsely-vegetated fields including disturbed areas, feeding primarily on seeds supplemented by insects, spiders, and/or snails (Marshall 1992, Gilligan et al. 1994, Ehrlich et al. 1988). A nest cavity is excavated on the ground with the entrance typically protected by pebbles or possibly vegetation (Ehrlich et al. 1988). Breeding occurs from March to May, with eggs laid at daily intervals. The female alone incubates the eggs for a period of 10 to 14 days until hatching. Both parents tend and feed the young, which leave the nest and fledge after approximately 9 to 12 days (Ehrlich et al. 1988). The streaked horned lark is often observed on fence posts and may also be observed if the nest is disturbed, when the female will fly low and some distance from the nest, and display to distract the intruder.

Environmental Baseline

The streaked horned lark was once common in the Willamette, but is now rarely seen. In the Willamette Valley, the streaked horned lark is documented in Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington, and Yamhill Counties (Oregon Natural Heritage Program 1998, Marshall 1992). There are no known breeding populations of the streaked horned lark at the Willamette Valley Projects. However, suitable breeding habitat does occur on project lands, including the Dike 2, Applegate, and Kirk Pond management units at Fern Ridge, just

below Fall Creek Dam, below Dorena Dam at Schwarz Park, and at Row Point along Dorena Reservoir.

WHITE-TOPPED ASTER

Biological Information

White-topped aster (*Aster curtus*), a small perennial member of the composite family, is native to the prairies of western Washington and portions of Oregon (Hitchcock and Cronquist, 1973). Eastman (1990) reports that white-topped aster grew in the native grasslands that were once common from the Willamette Valley to Vancouver Island, British Columbia. White-topped aster flowers late into August and September.

Environmental Baseline

White-top aster was formerly known from localities throughout the Willamette Valley, north to Portland, and is apparently restricted to native, ungrazed tufted hairgrass prairies. Destruction of prairie habitat in the Willamette Valley has lead to a drastic reduction in Oregon populations. White-topped aster is documented in Clackamas, Lane, Linn, Marion, and Multnomah Counties (Oregon Natural Heritage Program 1998). Large populations of white-top aster are found at Fern Ridge Reservoir in the Amazon Dike #2, Royal Amazon, and Fisher Butte Management Units. Small populations are found in the Kirk Pond, South Applegate, and South Marsh units. The populations on Fern Ridge project lands are annually surveyed using random sampling methods. The populations on USACE lands are protected from grazing and other incompatible uses.

WAYSIDE ASTER

Biological Information

Wayside aster (*Aster vialis*) is a 1 to 2 meter tall perennial in the Aster family (Asteraceae) with yellow, rayless flowers. It blooms from July to early August and can be found in the Willamette Valley in open woodlands (Eastman 1990) of Lane and Linn Counties (Oregon Natural Heritage Program 1998).. This extremely rare plant was thought to be extinct until it was re-discovered near Eugene in 1980 (Eastman 1990). The success of wayside aster depends upon insect pollinators, as the species does not self-fertilize, nor is it self-compatible.

Environmental Baseline

Wayside aster occurs on project lands at Cottage Grove Lake, along a Lane County right-of-way across the road from Catfish Acres in the London Management Unit. Annual monitoring is undertaken each August and consists of counting the number of clumps and stems. The boundaries of the population have been mapped. Monitoring has shown little variation in the plant population over time.

TALL BUGBANE**Biological Information**

Tall bugbane (*Cimicifuga elata*) is found in mature mixed forests of conifer and deciduous trees at low elevations. It flowers during August and September, occurring west of the Cascade Mountains, from the Olympic Peninsula in Washington to northwest Oregon (Hitchcock and Cronquist 1973). This large (1 to 2 meters tall) woodland plant is a member of the buttercup family. It is a herbaceous perennial that grows from a woody rootstock and flowers from June to August. Tall bugbane is usually found in populations of 25 plants or less. It is often growing on north slopes in fairly dense forests, usually associated with big-leaf maple (*Acer macrophyllum*) openings in the canopy.

Environmental Baseline

Tall bugbane is documented in Benton, Clackamas, Lane, Linn, Marion, Multnomah, Washington, and Yamhill Counties (Oregon Natural Heritage Program 1998). There are two known sites on USACE project land in the Willamette Basin. Both are located at the Foster Dam project. One population consists of a few plants located across the river from the Sunnyside Campground boat dock. The second is on the south side of the Lower Santiam River, just above the bridge crossing Foster Lake. This site consists of five metapopulations. The population at this site has experienced extreme fluctuations in numbers from a few plants in 1995 to over 100 plants in 1996. No monitoring was undertaken in 1997, but monitoring in 1998 located less than 10 plants. Tall bugbane has been found to undergo years of dormancy, and this combined with browsing by deer may explain the drop from 1996 to 1998 (S. Holmes, personal communication, 1999). There is also a site located on private land near Dorena Lake south of Government Road. The plants at this site are located in a fairly recent clear cut.

NORTHERN RED-LEGGED FROG**Biological Information**

The northern red-legged frog (*Rana aurora aurora*) inhabit moist forests, wetlands, and riparian habitats, and slow-moving streams west of the Cascades from southwest British Columbia to northern California (Leonard et al., 1993). Red-legged frogs are highly terrestrial and forage in forests near water. They breed and lay eggs in relatively slow-moving water in ponds, along rivers, in reservoirs, lakes, springs, and marshes from in January or February. Eggs are weakly attached to stems of emergent vegetation or submerged branches below the surface of the water and float to the surface as eggs mature (Leonard et al., 1993). Tadpoles metamorphose over a period of 4 to 5 months. During the non-breeding season, northern red-legged frogs have been found in moist forest situations 600 to 900 feet or more away from standing water (Nussbaum et al. 1983).

Environmental Baseline

The Oregon Natural Heritage Program (1998) identifies the northern red-legged frog as occurring in Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington, and Yamhill Counties of the Willamette Valley. Willamette Valley projects support at least two breeding populations of northern red-legged frogs. The first and most important is in the Applegate Unit at Fern Ridge. At the Frog Pond in this unit, 20 to 40 egg masses are found each year. Thistle Creek Pond, just upstream from the road culvert, also supports northern red-legged frogs, and is a good place to see adults in the late summer. This pond is the only pond on the projects that does not support exotic species. Hills Creek Pond at the Cougar project also supports the northern red-legged frog. Egg masses have never been found at Tufti or Spillway Ponds, where bullfrog numbers are high. The following areas are annually monitored for northern red-legged frog egg masses: Frog Pond, Hospital Pond, Tufti Pond, Spillway Pond, Dexter Ponds, Thistle Creek Pond, Kirk mitigation and East Wildlife Ponds, and Schwarz Pond.

FOOTHILL YELLOW-LEGGED FROG**Biological Information**

In Oregon, the foothill yellow-legged frog (*Rana boylei*) is found in Pacific drainages from the North Santiam River, southward to the Klamath and Winchuck Rivers (Borisenko and Hayes 1999, Leonard et al. 1993). The Willamette Valley historic distribution of the foothill yellow-legged frog includes Lane, Linn, and Marion Counties (Oregon Natural Heritage Program 1998). The species is found in and around permanent open, low-gradient streams with rocky, gravelly, or sandy substrates, and feed upon aquatic and terrestrial insects and invertebrates (Borisenko and Hayes 1999, Nussbaum et al. 1983, Marshall 1992,). The foothill yellow-legged frog breeds from mid-March to June in low-velocity tributary streams; egg masses are deposited on a solid substrate of gravel or rock along the margins of streams or pools (Borisenko and Hayes 1999, Nussbaum et al. 1983, Leonard et al. 1993). Depending upon temperature, eggs develop in from 5 to 30 days and the larvae develop over a period of 3 or 4 months, feeding on epiphytial algae in low-flow backwater pools (Borisenko and Hayes 1999, Leonard et al. 1993, Nussbaum et al. 1983). Metamorphosis takes place from late July to early September (Leonard et al. 1993, Nussbaum et al. 1983).

Environmental Baseline

In 1997 and 1998, Aaron Borisenko and Marc Hayes revisited 14 locations in the Willamette Valley where the foothill yellow-legged frog historically occurred. These sites included two on the mainstem Willamette River, the North Santiam River near Mehama, two tributaries of the Middle Fork Willamette River near Lookout Point Reservoir, two tributaries upstream of Fall Creek Reservoir, two tributaries upstream of Dorena Reservoir, and five tributaries upstream of Green Peter and Foster Reservoirs. Foothill yellow-legged frogs occurred at only one of these

locations, a site 6.3 miles east of Foster (Borisenko and Hayes 1999). Dorena, Foster, and Lookout Point Reservoirs have inundated some of the historic foothill yellow-legged frog localities; other historic sites are either partially or completely isolated from the mainstem Willamette River and its tributaries (Borisenko and Hayes 1999). A high risk of extirpation is identified by Borisenko and Hayes (1999), attributing generally high levels of disturbance (including exotic aquatic predators or competitors), direct and indirect influence of impoundments, and water quality. The effects of the Willamette Valley projects to the foothill yellow-legged frog include inundation of suitable habitat, as well as population isolation by restricting or eliminating corridors for the species.

SHAGGY HORKELIA

Biological Information

Shaggy horkelia (*Horkelia congesta* ssp. *congesta*) is a small, low-growing herbaceous perennial in the rose family (Rosaceae) that blooms from June through July. This species occurs in wet prairies and oak savannahs.

Environmental Baseline

Shaggy horkelia is documented in Lane, Linn, Marion, Polk, and Washington Counties of the Willamette Valley (Oregon Natural Heritage Program 1998). There are five populations of shaggy horkelia on USACE project land. At Row Point at Dorena Lake, the species is located along a trail leading to the water. Four other populations are found at Fern Ridge Reservoir located at the Kirk Pond, Amazon Dike #2, and Royal Amazon Management Units, and the Fisher Butte Research Natural Area. The plants in the wet prairie area of Fern Ridge Reservoir are included in the rare plant monitoring plan that has been in effect since 1995. Plants are counted using a nested frequency monitoring technique that will provide indications of trends, if any, in the population.

HOWELL'S MONTIA

Biological Information

Howell's montia (*Montia howellii*) is a small annual that has tiny, seldom-seen flowers that begins flowering in February, and be best seen in March when little else is in flower. This species grows only in moist woods in lowland areas west of the Cascade Crest from British Columbia to northwest California (Hitchcock and Cronquist 1973).

Environmental Baseline

Howell's montia is documented in Benton, Clackamas, Lane, Linn, and Multnomah Counties of the Willamette Valley (Oregon Natural Heritage Program 1998). On USACE project lands there are currently eight known locations. One site is at Menears Bend Campground near Foster

Reservoir. A few plants are scattered throughout the moist, lower end of the gravel parking lot below the Lookout Point administration building adjacent to Dexter Reservoir. Hundreds of plants are found at the gravel parking lot of Meridian Park adjacent to the top of Lookout Point Dam. Two relatively small populations are found at Dorena Reservoir, one at Schwarz Park and the other is in the project operation and maintenance compound. Another relatively small population is found in the project operation and maintenance compound below Fall Creek Reservoir. At Fern Ridge Reservoir, *Montia howellii* is found at two locations on private, BLM, and USACE ownership at Cantrell Road and Kirk Pond.

The Kirk Pond unit contains the largest population of *Montia howellia* on Willamette Basin projects lands, approximately 10,000 to 25,000 plants. The population occurs in clumps and extends from the edge of the paved parking area adjacent to the river in Kirk Park to approximately 100 meters north of the Franklin Bridge. It is found on the unimproved and unmaintained dirt roadway. This roadway is used by the USACE as right-of-way access for maintenance of the Long Tom Channel. Although its native habitat in Oregon is somewhat of a mystery, it appears to require open areas along streams where there is no competition from perennial grasses. When the dam was built at Fern Ridge, this habitat might have been present. The existing population may be a remnant of a native population, and perhaps wound up on the road through fill dirt during construction. This habitat has been maintained by the disturbance (suppression of other species) created by vehicle use of the road, and the presence of wet, waterlogged soils in the early spring. Although this population exists by virtue of vehicles, vehicle use on private land during the winter months of 1989 destroyed an estimated 10,000 plants and temporarily damaged the habitat by creating severe ruts in the roadway.

The Dorena, Fall Creek, and Cantrell Road populations are much smaller. The Cantrell Road population is in the ruts of a dirt road that gets very little use. At this time, no management actions are necessary. The site near the Santiam River is in an area that gets a lot of public use. It may be necessary in the future to construct an enclosure to keep people from trampling the plant. The population at the Fall Creek and the two at Dorena are all relatively small (Fall Creek having less than 15 plants) and occur in gravel parking lots and vehicle pullouts.

Monitoring has included spot checking populations to see if the plants are still at the same location, using arbitrary abundance ratings. Recommendations are in place for the management of the Kirk Park population of *Montia howellii*. These include avoiding vehicle use during on roadways with the species.

REFERENCES

- 58 FR 27260. Finding on Petition to List the Spotted Frog. Endangered and Threatened Wildlife and Plants. Notice of 12-month petition finding. Federal Register. Vol. 58, No. 87, pp. 27260 - 27263. 7 May 1993.
- Aulman, D.L. 1992. The impacts and pressures on west coast peregrines. Pages 55 - 65 in J.E. Pagel, ed. *Proceedings: symposium on peregrine falcons in the Pacific Northwest, January 1991*. Rogue River National Forest. 125 pp.
- Campbell, R. Wayne, Neil K. Dawe, Ian McTaggart-Cowan, John M. Cooper, Gary W. Kaiser, Michael C.E. McNall, and G.E. John Smith. 1997. *The Birds of British Columbia. Volume 3 - Passerines (Flycatchers through Vireos)*. University of British Columbia Press. Vancouver.
- Christy, R. W. and S. D. West. 1993. *Biology of Bats in Douglas Fir Forests*. U. S. Department of Agriculture, Forest Service. Pacific Northwest Research Station, GTR-308, Portland, Oregon.
- Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The birder's handbook: a field guide to the natural history of North American birds*. Simon and Schuster, Inc., New York, NY. 785 pp.
- Fyfe, R.W. and R.R. Olendorff. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. Canadian Wildlife Society Occasional Paper No. 23. Environment Canada, Wildlife Service.
- Henny, C.J., and M.W. Nelson. 1981. Decline and present status of breeding peregrine falcons in Oregon. *The Murrelet*. 62:43-53.
- Holland, D. C. 1991. *A Synopsis of the Ecology and Status of the Western Pond Turtle (*Clemmys marmorata*) in 1991*. Report to National Ecology Research Center, US Fish and Wildlife Service, San Simeon, California.
- Holland, D. C. 1994. *Draft final report on the western pond turtle project*. Prepared for Wildlife Diversity Program, Oregon Department of Fish and Wildlife. Portland, Oregon
- Holmes, S. 1999. Botanist, Bureau of Land Management. Personal Communication with Cheshire Mayherson).

- Leonard, William P., Herbert A. Brown, Lawrence L.C. Jones, Kelly R. McAllister, and Robert M. Storm. 1993. *Amphibians of Washington and Oregon*. Seattle Audubon Society Seattle, Washington. 168 pp.
- Marshall, David B. 1992. *Sensitive Vertebrates of Oregon*, First Edition. Oregon Department of Fish and Wildlife. Portland, Oregon.
- Maser, Chris, Bruce R. Mate, Jerry F. Franklin, and C.T. Dyrness. 1984. *Natural History of Oregon Coast Mammals*. Museum of Natural History, University of Oregon. Eugene, Oregon.
- McAllister, K. R. and W. P. Leonard. 1997. *Washington State status report for the Oregon Spotted Frog*. Washington Department of Fish and Wildlife, Wildlife Management Program. Olympia, Washington. 38 pp.
- Nussbaum, Ronald A., Edmund D. Brodie, Jr., and Robert M. Storm. *Amphibians and Reptiles of the Pacific Northwest*. University of Idaho Press, Moscow. 332 pp.
- Olsen, P. and J. Olsen. 1978. Alleviating the impact of human disturbance on the breeding peregrine falcon. Corella, Journal of the Australian Bird Study Association 2(1):1-7.
- Oregon Natural Heritage Program. 1998. *Rare, Threatened, and Endangered Species of Oregon*. Oregon Natural Heritage Program, Portland, Oregon. 92 pp.
- Pacific Coast American Peregrine Falcon Recovery Team 1982. *Pacific Coast recovery plan for the American peregrine falcon (*Falco peregrinus anatum*)*. U.S. Department of the Interior, Fish and Wildlife Service. 86 pp.
- Pagel, J.E. 1992. Protocol for observing known and potential peregrine falcon eyries in the Pacific Northwest. Pages 83-96 in J.E. Pagel, ed. *Proceedings: symposium on peregrine falcons in the Pacific Northwest, January 1991*. Rogue River National Forest. 125 pp.
- Pagel, J.E. 2000. Peregrine Falcon Specialist, U.S. Forest Service, Rogue River National Forest. Personal Communication. Telephone conversations, meetings, and field visits with Robin Leighty, February 1995 through present.
- Pagel, J.E. and W.M Jarman. 1991. Peregrine falcons, pesticides, and contaminants in the Pacific Northwest. Journal of Pesticide Reform. 2(4) 7-12.
- Palmer, R.S. and White, C.H. 1988. Peregrine (*Falco peregrinus*) pp. 324-380 in Palmer, R.S., ed. *Handbook of North American birds*. Vol. 5. Yale Univ. Press, New Haven.

- Snow, C. 1972. *American peregrine falcon (Falco peregrinus anatum) and Arctic peregrine falcon (Falco peregrinus tundrius)*. Habitat management series for endangered species. Report No. 1. U.S. Department of the Interior, Bureau of Land Management. 35 pp.
- Stebbins, Robert C. 1954. *Amphibians and Reptiles of Western North America*. McGraw-Hill Book Co. New York.
- Terres, J.K. 1980. The Audubon Society encyclopedia of North American birds. Alfred A. Knopf, Inc., New York. 1,109 pp.
- Thelander, C.G. 1978. The status of peregrine falcons in California - past and present. Pages 3-12 in Schaeffer, P.P. and S.M. Ehlers. eds. *Proceedings: National Audubon Society symposium, the current status of peregrine falcon populations in North America, December 1978*.
- Verts, B.J. and L.N. Carraway. 1998. *Land Mammals of Oregon*. University of California